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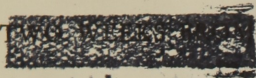
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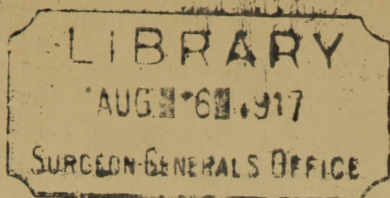
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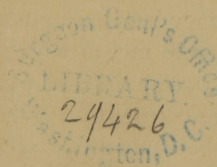
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OBSERVATION

ON THE

DISEASES OF THE HEART NOTICED AMONG SOLDIERS,
PARTICULARLY THE ORGANIC DISEASES.



[From "Fili's contribu-
tions relating to the causa-
tion and prevention of
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CHAPTER TENTH.

OBSERVATION ON THE DISEASES OF THE HEART NOTICED AMONG
SOLDIERS, PARTICULARLY THE ORGANIC DISEASES.

BY J. M. DA COSTA, M. D.,

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The Clinical Material for this Chapter. — Valvular Diseases. — Table of Valvular Diseases. — Cases of Valvular Disease following Rheumatism. — Cases of Valvular Diseases not preceded by Rheumatism. — Absence of Bright's Disease or any Diathetic Affection. — Cases of Valvular Disease attributed to Protracted and Violent Exertion. — Case of Insufficiency of the Pulmonary Valves. — Cases in which Valvular Disease did not prevent the Performance of Military Duty. — Infrequency of Diseases of the Pericardium. — Enlargement of the Heart independent of Endocarditis or Pericarditis. — Hypertrophy of Heart from persistent Functional Disorder and after Fevers. — Enlargement due to a Rheumatic Diathesis, or existing prior to Enlistment. — Cases of Hypertrophy without Valvular Lesions amenable to Treatment. — Treatment employed in these Cases. — Cases of Enlargement with predominant dilatation infrequent. — Of Irritable Heart. — Conclusions.

IN this paper I shall discuss some points connected with the affections of the heart noticed among troops. During the war I held for a time the post of visiting physician to one of the largest military hospitals, and subsequently had in other hospitals wards allotted to me, to which soldiers affected with thoracic, particularly with cardiac disease, were sent. Some of the forms of these diseases were constantly recurring, and presented features of so much interest that they were carefully noted and studied. Notes of upwards of four hundred cases are thus in my possession; and while taking them as the basis of some of the deductions here made, I retain for analysis and publication elsewhere several groups of them, which, minutely analyzed, would require a more extended discussion than it is either desirable or convenient here to enter into. But an examination, especially of organic affections, inquiring into their cause, their disqualifying effect for doing duty, and the possibility of averting or remedying them, will, I trust, furnish a contribution not out of place in this volume, and in keeping with its general spirit.

First let me say a few words about valvular diseases. They were not on the whole very common, that is, the mass of those presenting cardiac disorders did not present signs of valvular disease. But when this was detected it was

Valvular
diseases.

ordinarily found to be due to the same causes which are known usually to generate it. To analyze thirty cases, taken indiscriminately from my note-books : —

TABLE OF VALVULAR DISEASES.

Case.	Seat and Character of Disease.	Supposed Cause.
I.	Aortic Insufficiency.	Acute Rheumatism.
II.	Mitral Constriction.	Pneumonia (Endocarditis).
III.	Mitral Insufficiency.	Acute Rheumatism.
IV.	Mitral Insufficiency.	Acute Rheumatism.
V.	Mitral Insufficiency.	Rheumatism.
VI.	Aortic Insufficiency.	Acute Rheumatism.
VII.	Mitral Insufficiency.	Before enlisting.
VIII.	Aortic Insufficiency.	Before enlisting ; rheumatism.
IX.	Aortic Insufficiency.	Endocarditis ; Pneumonia.
X.	Mitral Insufficiency.	Rheumatism.
XI.	Mitral Insufficiency and Chronic Pericarditis.	Acute Rheumatism.
XII.	Aortic Constriction.	Pleuro-pneumonia (Endocarditis).
XIII.	Aortic Insufficiency.	Acute Rheumatism.
XIV.	Mitral Insufficiency.	Noticed after heavy marching.
XV.	Aortic Insufficiency and Constriction.	Acute Rheumatism.
XVI.	Aortic Insufficiency and Chronic Pericarditis.	Acute Rheumatism.
XVII.	Mitral Insufficiency.	Measles.
XVIII.	Aortic Constriction.	Diarrhœa ; rheumatism in hips.
XIX.	Mitral Insufficiency.	Rheumatism.
XX.	Mitral Insufficiency and Chronic Pericarditis.	Acute Rheumatism.
XXI.	Mitral Insufficiency.	Pneumonia (Endocarditis).
XXII.	Mitral Insufficiency.	Before enlisting.
XXIII.	Mitral Insufficiency.	Acute Rheumatism.
XXIV.	Aortic Constriction and Insufficiency.	Before enlisting.
XXV.	Aortic Constriction.	After heavy marching.
XXVI.	Mitral Insufficiency.	Rheumatism.
XXVII.	Aortic Insufficiency.	Uncertain.
XXVIII.	Aortic Insufficiency.	Before enlisting.
XXIX.	Aortic Insufficiency.	Before enlisting.
XXX.	Insufficiency of pulmonary valves.	No distinct cause.

Looking over this table, we find these results: Of the thirty cases, fifteen had rheumatism for the first time while in service, and ten of these had acute articular rheumatism, produced for the most part by exposure. In the remaining five, the attacks had been more subacute or muscular, and they are marked in the table simply as rheumatism. Five cases presented the history of cardiac disease prior to enlisting, and several of these again had had articular rheumatism. One of them had a slight attack of rheumatism prior to the war, but also stated that he inherited disease of the heart from his mother. Two patients first noticed the cardiac disturbance after heavy marching, to which they attributed it, though it might be thought more likely that it had existed before. With greater certainty may this be said of one patient (Case XVIII.), who asserted that it was only after a severe attack of diarrhoea that his heart at all annoyed him. Four of the cases mentioned in the table believed that they had been seized with pneumonia, being previously in excellent health, and that since the acute malady the cardiac symptoms had developed themselves.

The first of these patients (Case II.) stated that he had flying rheumatic pains, particularly in the shoulder joints, prior to enlisting, and occasionally fluttering of the heart when lifting heavy timbers. But he was able to serve with his regiment throughout the spring and summer campaign of 1864, doing much marching; and as it was only after a severe attack of inflammation within the chest, called pneumonia, that he became troubled with shortness of breath and expectorated pure blood, it may well be questioned if there existed any previous disease of the heart. It should be added that before being sent to the hospital in September he contracted fever, and had chills and night sweats. While under my observation he presented the physical signs of mitral constriction with some regurgitation, and excessive irregularity of the action of the heart, attended with great shortness of breath, and at times with giddiness. Either, it is evident, a valvular affection had developed itself subsequent to the acute seizure, or a slight preëxisting disorder had been greatly aggravated by this and the heavy marching.

In the second instance of disease of the valves following an acute attack (Case IX.), no such doubtful point can be adduced. The man, a private in Company B, 187th Pennsylvania Volunteers, had been an active farmer before enlisting in January, 1864. He never had had a severe disease, never acute rheumatism; had had

occasionally pain in the left shoulder, but was a vigorous man in fine health when he joined his regiment. He did hard duty with it until the 28th of August, 1864, participating in all the marches south of the Rapidan, and was in most of the battles and skirmishes which occurred. He was found to possess aortic insufficiency marked to a high degree, and though he attributed the cardiac complaint chiefly to heavy marching and to the weight of the cartridges, he also mentioned having had something like an acute seizure; stating, that while on a march he was attacked with severe pain in the left side, which persisted and was soon accompanied by spells of faintness on exertion. In spite of this, he did more or less duty for two or three months, until he was sent to the Cuyler Hospital, and he was thence transferred for special treatment to my wards in Philadelphia.

In the third case (Case XII.), also, aortic disease existed. But the signs were those of constriction rather than of insufficiency. The patient was a private in the 22d New York Cavalry, forty years of age, and had been a blacksmith before joining the army. He was in excellent health when he enlisted in January, 1864, and had almost constantly enjoyed good health, though he stated that on two occasions prior to enlisting he had pneumonia, and that years before the war he had rheumatic pains in the hips and knees, but not severe, nor had he ever an attack of acute rheumatism. He was in several fights, and in one of these, in May, 1864, was dismounted, after which he was obliged to march on foot, which he did, from Port Royal, Va., to City Point. About the 15th of June he was seized with an acute thoracic affection, which he says was pronounced pneumonia. He recovered from this with some pain in the cardiac region, and with shortness of breath; the least exertion wearied him. He was ordered to Washington, and remounted in July, 1864; and soon afterwards did service in the Valley of the Shenandoah, but most of the time as blacksmith. The difficulty of breathing, however, increased so much, that after August 24th he was unable to do duty any longer. He was sent to several hospitals, and transferred to my wards September 29th; his main symptom was shortness of breath on exertion. The murmur was systolic, and very rough, of greatest intensity to the right of the sternum, and unattended by receding pulse, or throbbing of carotids, or very forcible impulse. The percussion-dullness in the cardiac region was not that of a decidedly enlarged heart, measuring only two inches and three quarters transversely, three and one quarter perpendicularly, and three

and a half obliquely. The chest was thirty-five and a half inches in circumference.

The fourth case (Case XXI.) was that of a private in the 109th New York Volunteers. Before enlisting, in December 22, 1863, he was a carpenter, and in admirable health; never had had rheumatism, or any sign of cardiac disturbance. He was taken sick February 15th, 1864, the day after arriving in Washington, with pain in the left side, etc., and was thought to have pneumonia of the left lung. He recovered slowly, but had pain about the heart, which he distinctly remembered to have annoyed him in March. His recovery was about that time considered sufficient to enable him to do light duty; and when his regiment was ordered to join the 9th Corps he accompanied it, going for the first time into the field. He was much troubled with palpitations while on the march, and on arriving at Warrenton Junction was attacked with a malarial fever, for which, May 2d, he was sent back from the front. He had thus, if the march to the front be excepted, never done any active duty. He remained four months under observation, presenting the signs of mitral regurgitation, with forcible action of the heart, though with but slight increase in its size. His general appearance was good, even when first seen, and he never showed the least signs of anæmia.

I have given the histories of these cases somewhat in detail, because they bear on a very interesting point of cardiac pathology — the occurrence of endocardial inflammation, and subsequent valvular disease, without antecedent rheumatism, or Bright's disease, or any diathetic affection.

It is true that rheumatic pains had preëxisted in two of the cases, but in the last-mentioned of these, at least, not in such a manner as to be looked upon as a causing element. The supposition of pneumonia having given rise to the valvular lesion is of course not to be entertained. If pneumonia really happened at any time, — and only one of the cases (the first) presented any signs which rendered the previous occurrence of either pneumonia or pleuro-pneumonia a likelihood, — it happened as a complication of the endocarditis, the presence of which might very readily have been overlooked, or not communicated to the patients. Moreover, one of them did not say scarcely any thing on the subject of the supposed pulmonary inflammation; but attributed the disease, more persistently, to the heavy marching. Thus, then, we have cases of endocarditis, contrary to the supposed opinion, of idiopathic origin, and it is quite possible that violent efforts in several of them

Absence of antecedent Bright's disease or any diathetic affection in the preceding cases.

may have acted as predisposing causes, and have had just as much to do with the development of the inflammation as any exposure to which the men were subjected.

This may have happened in the case just alluded to (Case IX.), which, indeed, has only, on account of some of the statements of the man, been classed with those that were thought to have presented marked symptoms of an acute thoracic affection. In two other cases placed in the tabular view for analysis, heavy marching and over-exertion were looked upon alone and decidedly as the cause of the cardiac trouble. In one of these (Case XIV.), no disorder of the heart whatever existed before enlistment, so far as could be ascertained, and the first symptom noticed was strong beating of the organ after a great deal of marching and exertion. In the second (Case XXV.), much the same history was given. In both, the heart was considerably enlarged; in one indeed, out of proportion to the amount of valvular lesion, and it seems likely that here the affection of the valves was the indirect consequence of the enlargement. But though this may be said of the instance of mitral insufficiency (Case XIV.), it can scarcely be stated of that of aortic constriction (Case XXV.). We find, then, cases of valvular disease originating after heavy marching and violent exertion. Some of these may be due to latent idiopathic endocarditis, others are probably the consequence of preceding enlargement.

Cases of
valvular
disease at-
tributed to
protracted
and violent
exertion.

Fevers are not mentioned in the tabular statement as giving rise to valvular disease. Yet many of the patients attributed the disorder of the heart to them, particularly to typhoid fever. But on analysis it was almost invariably found that these patients had had acute rheumatism previously, or signs of cardiac disturbance, and that these had become much aggravated after the fever, rather than made their appearance with it.

Concerning the signs and symptoms of the abnormal condition of the valves, it is needless to go into detail. However interesting to the student of physical diagnosis, it would not serve a useful purpose here to examine them, and to see in how far they correspond with those considered by observers generally, as characteristic. But as regards Case XXX., an exception may well be made, on account of the rarity of the lesion presented.

CASE XXX. *Insufficiency of the Pulmonary Valves.* — Henry F. L——, sergeant Company L, 9th New York Heavy Artillery, was sent to my ward in April, 1865. He was a fine, healthy looking man, who complained of nothing excepting shortness of breath, and some pain

in the cardiac region. The shortness of breath was only markedly developed on exertion of any kind; the pain was not severe, but from its persistency, by constantly reminding the patient of the cardiac malady, may have been the chief cause of the frequent depression of spirits from which he suffered. His digestion was excellent; there was no dropsy. He was unable to trace the disease of the heart to any exciting cause. He had been in service almost from the beginning of the war, never had had rheumatism; had typhoid fever in 1861, not very long after enlisting, and on his recovery from it until he reënlisted, saw much active service. Indeed, he was almost constantly on duty until three months before his admission into the Filbert Street Hospital, until, indeed, a swelled testicle caused him to be placed under medical care. Since that time, and when returning to duty, after being relieved from the affection mentioned, he noticed palpitation. The pulse was 72, full, rather abrupt; respirations 24; the impulse of the heart was extended and forcible; the cardiac percussion-dullness increased, though not to an extreme degree. On auscultating the heart a loud murmur was heard, loudest at the left edge of the sternum, near the fourth costal cartilage, and at the fourth interspace, and transmitted thence to the left edge of the heart and upwards as far as the clavicle on the left side. At the apex it was only faintly perceived, and it was scarcely audible, at times wholly inaudible, at or near the aortic cartilage, where a well-marked normal second sound was heard. At the pulmonary cartilage, and in the second interspace on the left side, the murmur was very much more distinct than to the right of the sternum, but in the positions indicated on the left side, not a trace of a second sound could be discerned. There was no murmur in either carotid. On closely analyzing the murmur, at its place of greatest intensity, it was found to consist in reality of two: the first short, comparatively indistinct, systolic, and soon lost as the stethoscope was removed to other parts of the cardiac region; the second long, loud, distinct, and completely taking the place of the normal second sound of the valves of the pulmonary artery.

It may be a matter of astonishment that a person with so serious a valvular trouble should have suffered on the whole so little from it, and should have been able to discharge his duties as a soldier for so long a time without any particular inconvenience arising from the disease of the heart. For it cannot be supposed that the cardiac malady dated merely from the attack of swelled testicle; but it must have existed prior to his reënlisting, and perhaps even prior to his entrance into the service. He was an ardent soldier, anxious not to be away from his regiment, and nearly always with it. Yet, if we except the attack of fever at the outset of his military career, his history did not show that he had had any of the diseases inci-

dent to troops, or that he had been obliged to be careful of himself, or relinquish any of his duties, until he went to the hospital for the complaint mentioned. But while suffering from the irritation of this, and on returning with his health not in the usually good condition, he began to be annoyed, or rather, to have his attention directed to his heart, and was shortly afterwards sent from camp to be treated for the cardiac complaint. This is, indeed, the history of very many, I may say of the majority, of these patients. I could adduce case upon case that came under my observation during the war, of men who did not notice the affection of the heart until some acute malady reduced their strength. Sometimes it was a severe attack of diarrhœa, but oftener a fever, particularly a typhoid fever, or measles. But whatever the disease, the sequence ran thus: little, if any, disturbance previously; an acute attack; symptoms of cardiac derangement noticed then, or during convalescence, or soon after return to duty.

This statement may seem to invalidate the remarks above made as to the presumable origin of some cases of valvular disease in acute idiopathic endocarditis with or without active thoracic symptoms, or happening during over exertion. Yet, though this objection to the view of the matter cannot be positively set aside, I do not think it applies to the cases there cited. They were admitted as such only after the most careful sifting of the evidence they furnished. The attack was in all of comparatively recent date; the valvular affection was not attended with marked cardiac enlargement; moreover, the men had enlisted at a late period in the war, and passed the inspection of the surgeon at a time when much greater care was taken with the examination of the recruit, and when valvular diseases were not apt to be overlooked.

But how did it happen that men with valvular affections could perform military service at all—could bear the marching, the exposure, the excitement of a soldier's life? For, even deducting all doubtful cases, there were numbers whose histories clearly indicated that they had had cardiac disease long prior to its being observed, who had yet performed faithfully their duty. For instance, Case XXII. presented a clear history of disease of the heart, dating from inflammatory rheumatism in 1861. He enlisted January 7th, 1863, for three years, did continuous duty up to the 30th of April, 1864, when he caught measles, followed by some rheumatic pains. About this period, and during his convalescence, he was noticed to have enlargement of the heart, with valvular disease. He came

Cases in which valvular disease did not prevent the performance of military duty.

under my charge August 1st, 1864, had no dropsy, suffered occasionally from palpitation, complained of pain about the heart, and of inability to lie on his left side. The impulse was forcible, and extended, and there was a mitral murmur. The pulse was ninety-six, not particularly irregular. He was a cavalryman, and it may be a question whether his being mounted was not a cause of his ability to do duty so long. But even in those serving in other arms of the service, the power to perform duty for a considerable period was remarked.

Now, in the explanation of these cases, we must look closely to the amount of disturbance of the organ and the extent of the coexisting enlargement. When the heart is greatly disturbed in its function, or there is much increase in its size, active service becomes, for any length of time, an impossibility. Otherwise, it is quite possible. I met with an instance of aortic regurgitation in a soldier, the type of excellent physical health, who, for a short distance at least, was a good runner. And I may, in concluding this part of the inquiry, allude to the case of a gentleman whom, from repeated examinations before the war, I knew to have an affection of the mitral valves, and who served creditably during a long campaign on the staff of a general high in command, where the officers had little rest, and who had, particularly, the reputation of not sparing them. The valvular affection was not then, and is not now, attended with much discomfort, or evidence of disorder of the circulation.

I insist thus upon comparative latency of the symptoms, or rather upon absence of marked functional disturbance and considerable enlargement, as essential elements in allowing a valvular disease to remain inactive; and it has been made apparent how, if the circulatory function be deranged in consequence of a fever or other acute malady, or of any departure from the previous standard of general health, the affection of the heart begins to show itself, and become troublesome. Yet, let it not be understood that cases of tolerance of the cardiac disease, if I may so express myself, bore more than a certain — though an unexpectedly large — proportion to those in which fatigue and exposure rapidly led to the manifestations of the symptoms of a disordered heart. For a number of my patients with valvular disease told me that almost from the first they were unable to keep up with the regiment on the march, in consequence of choking sensations, shortness of breath, and giddiness (Cases VII. and XI. were particular illustrations); or were unable to bear the weight of their knapsacks and equipments; and,

so as not to lag too far behind, were obliged to throw them away. It is quite likely that some of these cases of valvular disease died sudden deaths, and were grouped among those who, from fatigue, had sunk exhausted at the wayside, or had had a sun-stroke. But this is a mere surmise, for I have no data for determining the point.

Pericardial disorders were not, on the whole, frequently encountered. Indeed, considering the hundreds of cases of cardiac affections that I examined, I was struck with their rarity. When found, they presented, generally, coexisting endocardial trouble, and were rather the remnants of a pericarditis with friction indicative of roughening of the membrane, or with what could be regarded as presumable signs of adhesion, than chronic pericarditis with effusion. In the following case, however, there was effusion which disappeared under treatment.

Infrequency
of diseases
of pericar-
dium.

CASE XXXI. *Chronic Pericarditis ; Recovery under Iodide of Potassium, etc.* (Case-Book IV., p. 130). — John W. M——, private, Company D, 14th New York Artillery, aged nineteen, formerly a farmer ; enlisted July 4th, 1863, for three years. He stated that he had felt pain over the heart, and had occasional palpitation, before enlisting ; but that the examining surgeon, after investigation, pronounced this not to be due to a disease of the heart. The battalion to which M. was attached was sent to Sandy Hook, N. J., and while there he had a severe attack of what he says was regarded as inflammation of the lungs, and was under medical treatment for two months. After this seizure he had more pain about the heart, with shortness of breath and, at times, palpitation. He was transferred with his regiment to the army of the Potomac, in March, 1864, and did duty until June 17th, 1864 ; when, in consequence of diarrhœa, succeeded by rheumatism, and by an increase of the signs of the heart trouble, he was, after having been in a camp hospital, sent to a general hospital in July, and to my wards September 14th. He had at that time recovered from the diarrhœa, but still had, off and on, rheumatic pains in his limbs. He had much difficulty of breathing, and complained of the pain in the cardiac region, which constantly grew worse toward evening, and was then attended with palpitation. His nights were restless ; he could not lie on the left side. After he had been under observation for a day or two, it was observed that he had, occasionally, a slight swelling of the lower limbs, and, more constantly, of the hands. He was a man of very temperate habits, never smoked, chewed, or drank.

The physical examination showed an impulse extended and very deficient in force ; an increased percussion-dullness in the cardiac region, with soreness to the touch ; and great indistinctness of the sounds of the heart, which, however, were very much more distinct at the base than at the apex. He was directed to take iodide of potassium, five

grains three times daily, while tincture of iodine was painted over the front of the left side of the chest; and on the 26th, a solution of bitartrate of potassa was also ordered as a daily drink. Under this treatment he steadily improved. October 12th it was noted that both sounds had become quite distinct, and that the percussion-dullness had decreased. This was still more marked by the 27th, and as his symptoms had at the same time greatly ameliorated, he was allowed to go home on furlough. November the 18th he returned, looking well, and nothing particularly abnormal could be found upon auscultating the heart. Soon afterwards he returned to his regiment.

From this record, it is difficult to fix the exact period at which the pericarditis happened. It either occurred as a complication with, and at the time of, the supposed pneumonia, in which case the man had the pericardial affection for eight months or upwards, before I saw him, and did duty in the field, with his pericardium probably filled with fluid; or the disorder dated from the rheumatism shortly following the diarrhœa, and was then of nearly three months' duration. Though the former view appears the less probable, the details of the history favor it.

Let us now turn to other forms of organic disease of the heart, to
Enlargement of heart independent of endocarditis or pericarditis. enlargements of the heart unconnected with endocarditis or pericarditis. And here I will first describe *hypertrophy*. It was very commonly met with, and presented the usual physical signs: increased percussion-dullness, forcible, extended impulse, dull, heavy, first sound. This case will illustrate them, as well as some of the attending symptoms.

CASE XXXII. *Symptoms of Cardiac Disorder appearing during a March; Hypertrophy of Heart* (Case-Book IV., p. 236).—Paul S——, private, Company H, 8th New York Artillery, aged twenty-one years, a blacksmith prior to enlisting, joined the army August 12th, 1862, for three years. He said, — and repeated examinations failed to elicit any contradictory statements, — that before enlisting he had always enjoyed excellent health, and had been capable of undergoing much exertion and fatigue without any disturbance of the heart. In February, 1864, he had an attack of small-pox; and, on recovering from this, rejoined his regiment. On the marches in May, 1864, he had, for the first time, pain in the region of the heart, with palpitation, shortness of breath, and attacks of faintness, which rendered him unable to keep up with his comrades. He nevertheless continued on duty, coming up with his regiment at night after it had halted; and was with it in several engagements of the spring campaign. June 22d he was injured by being struck on the right shoulder by the limb of a tree cut off by a shell; and was sent to a general hospital for treatment, whence he was trans-

ferred, October 11th, 1864. After the injury, and while at the General Hospital, his heart difficulty grew worse.

Examined in October, he was found to have severe palpitations, attended at times with much shortness of breath, and always worse at night, the violent beating interfering with his sleep. He also complained of pain over the heart following any exercise, and of occasional dizziness with faintness. The pain in the cardiac region only existed on exertion. His appetite was good; the bowels regular. The impulse of the heart was extended, very heavy, and forcible; the first sound dull, prolonged, heavy; the second indistinct, even at the base. The percussion-dullness of the heart measured five inches transversely; four and seven-eighths perpendicularly, and five and a half obliquely, from its right upper edge to the apex. Though the impulse was very strong, it was not so strong as this great extent of percussion-dullness might imply. The pulse did not beat above seventy-eight, and was for a time reduced by aconite to between sixty and fifty-two. The man was made much more comfortable by treatment; but, being unfit for active service, was finally placed in the Veteran Reserve Corps, Second Battalion.

This case illustrates the physical signs of an hypertrophied heart, as well as the inconveniences it entails on the soldier, and in fact its common clinical history. Some further symptoms may be found in this and the succeeding record.

CASE XXXIII. *Hypertrophy of the Heart, much Cardiac Pain, Bleeding from the Gums and Lungs* (Case-Book III., p. 138). — George W. F——, private, Company B, 7th Michigan Volunteers, twenty-one years of age, a farmer before enlisting; enlisted October 22d, 1863, for three years, being well and strong at the time. Had an attack of inflammatory rheumatism three years prior to entering the service. Was on duty until January 1st, 1864, when he caught a severe cold, and on recovering from this the heart trouble supervened, manifesting itself chiefly by shortness of breath on exertion, and spitting of blood. After being transferred to various hospitals, he was sent to my wards, May 26th, 1864. He was a healthy-looking man, five feet nine inches in height, of excellent habits, using neither tobacco nor spirituous liquors. His appetite was good; the bowels regular; the gums were spongy — occasionally they bled. The respiratory organs were healthy; a trifling bronchitis forming the only exception to this statement. He had not then, nor had he had, any pains of a rheumatic character since enlisting, but was frequently annoyed by a sharp pain, strictly limited to the region of the heart. While quiet he had no palpitation; had dyspnoea on exertion, and found it difficult to breathe in the recumbent posture. Exercise still caused bleeding from the lungs, either of pure blood, or, more generally, of blood mixed with mucus. The impulse was extended and strong, and had in addition somewhat of a jerking stroke —

a character which the pulse, beating ninety-four to the minute, and forcible, did not share. The cardiac percussion-dullness was increased; the first sound long, murmurish over left ventricle, but without real murmur; the second sound distinct, yet not unnaturally so. The force and frequency of the impulse were considerably influenced both by aconite and aconitia, one thirtieth of a grain twice daily. And even the first sound became gradually less dull. The cardiac pain, however, persisted, and was at times noted to have been attended with soreness in the cardiac region. There was, however, no perceptible decrease in the cardiac diameters; and after several months of treatment, particular attention being paid to his diet, after a return home on furlough, and a cessation of the bleeding for some time, the man was, in a much improved condition, placed in the Veteran Reserve, Battalion I.

This patient presented as one of his symptoms spitting of blood; and this phenomenon, scarcely encountered in hypertrophy of the heart seen in civil life, I have found to be not at all infrequent among soldiers. Now it occurs under various circumstances. In the majority it first makes its appearance after excessive exercise, especially after the fatigue and excitement of a hard contested battle, or after a forced march. In some, as in the case just reported, it is associated with marked signs of cardiac distress, and though often produced by exertion, did not originally set in as the immediate consequence of this. In either instance it may not or may be combined, as it was in Case XXXIII., with evidences of a scorbutic state of system. Nor would I wish the inference drawn that its occurrence is invariably linked to the existence of an enlarged heart. I have encountered it under circumstances similar to those mentioned, in soldiers who merely presented an irritable state of the organ. In some cases, though not in many, it was a mere coincidence with the noticing of cardiac symptoms, being really due to a blow, or to a fall from or with the horse—the latter the more common. Again, the hæmoptysis may happen without any connection with a persistent cardiac disorder, either organic or functional. For I met with instances in which soldiers had spat blood more or less profusely after a battle, or much exertion, in whom, when examined a few weeks afterwards, perfect regularity of the heart's action existed, and not a trace of disease of the lungs. The simple pulmonary congestion, probably associated with the temporarily excited circulation, had passed away. These hemorrhages do not recur, excepting it may be when the cause recurs. I may add that I had a number of cases of these various forms of hæmoptysis for a long

time under observation, and not in one did any pulmonary trouble develop itself. Thus, then, hemorrhage from the lungs in soldiers happens often under circumstances unlike those in civil life, and has, with its dissimilar causes, both different consequences and a different meaning.

But to return to the study of hypertrophy. What were observed to be its causes? The most frequent was persistent functional disorder, especially that disorder which I have described as irritable heart. But I shall have to refer for the evidence of this to my paper on the subject. Very many cases originated after fevers; at all events I could not discover, on the closest investigation, that they had had any cardiac symptoms whatever prior to the fever. But, not long after going back to duty, they were troubled with shortness of breath and palpitation, and presented, when examined by me — which, it is true, did not, as a rule, happen for some months subsequent to the development of the cardiac symptoms — the signs of hypertrophy. The explanation of this is not difficult. It is well known how often, in typhoid fevers — and it was particularly with reference to them that the observations were made — the cardiac structure undergoes changes. If a man with a heart in this condition, or rather not fully restored from this condition, be sent to duty, as not uncommonly happened; if he take then much exercise, and keep up an excited action of the weakened organ, it is easy to see how hypertrophy, with more or less dilatation, will follow. It is true this explanation implies, as one of the causing elements, that continued functional disturbance will result in enlargement. But, as already stated, my experience on this point is so positive as to leave no doubt.

Hypertrophy from persistent functional disorder, and after fevers.

In a certain sense also due to continued functional excitement were those cases which originated during or after heavy marching.¹ They were by no means rare, and whether this be their true explanation or not, gave very distinctive histories.

CASE XXXIV. *Hypertrophy of the Heart subsequent to Heavy Marching; No Fever or preceding Derangement of Health* (Case-

¹ I use the term marching not simply of the marching of infantry — which then would imply excessive exercise as pedestrians as the acting cause — but also of the marching of cavalry and artillery, in which branches of the service the upper extremities come more into play. I have met, indeed, with the kind of hypertrophy under discussion in all arms of the service; it is true, more frequently in infantry. But, considering their greater number, this might well happen, without there being a greater absolute frequency. To determine this point positively, would, however, require an investigation on the largest scale, on which, at the same time, the number of troops of each arm engaged in a campaign were accurately known. Data of this kind are not in my possession.

Book V., p. 39).—Nath. C——, private, Company G, 1st Regiment Rhode Island Artillery, enlisted in August, 1862, and was very constantly on service for two years, doing much marching. He was a perfectly healthy man before enlisting. He first noticed shortness of breath and pain in the side in April, 1864, and subsequently marched with his regiment from Brandy Station to Petersburg, and then to the Valley, part of the time accompanying the 6th Cavalry. In August he had an attack of diarrhœa, found his shortness of breath much increased, and so great that he could not march; in consequence was sent to a hospital. He never had a fever. When he came under my charge some months afterwards, he was observed to have dilated hypertrophy. The impulse was one hundred and twenty-four, extended, moderately forcible; first sound dull, rather heavy; second sound not much altered, slightly increased. The transverse diameter of the heart was four inches; the longitudinal three and a half; the oblique four and seven eighths. The man was five feet nine inches in height, and had a well developed chest. He did not suffer much excepting on exertion.

In some cases the enlargement of the heart, though unconnected with valvular disease, appeared to have its origin in a rheumatic diathesis. Again, in others it had existed clearly before enlisting.

Enlargement due to a rheumatic diathesis, or existing prior to enlistment.

CASE XXXIII. *Affection of the Heart, probably Hypertrophy, existing prior to enlisting; Aggravation of Symptoms subsequent to a Wound, strictly limited Soreness in Cardiac Region* (Case-Book IV., p. 240).—Wm. H. L——, private, Company I, 112th Pennsylvania Volunteers, aged twenty-nine, enlisted August 3d, 1863, for three years. Was, while in civil life, a harness-maker, and had been much troubled with restlessness, shortness of breath, and with occasional fainting spells, for a year before entering the service. He never could bear the double quick, being always obliged to fall out; but he did duty regularly until June 3d, 1864, when he was wounded in the hand in an engagement at Cold Harbor, Virginia, having marched there from Front Royal without noticing palpitation, or being much annoyed by shortness of breath. While his wound was being treated at the hospital, marked attacks of palpitation occurred, accompanied by choking sensations, and at times by what appeared to him like a cessation of the impulse of the heart, when he felt as if without life enough to move or to make the least exertion. These symptoms still existed when he was sent into my wards October 11th. He was also very restless, complaining much of nervousness. Any noise excited palpitation, likewise exertion of any kind, such as going up-stairs. Generally slept well, excepting when disturbed by fits of violent beating of the heart. Appetite was good; bowels regular; used tobacco, but no ardent spirits; never had had rheu-

matism. The impulse was ninety-six, extended, rather forcible; the first sound dull, the second not increased. Diameters of percussion-dullness were: Transverse, three and a half inches; perpendicular, three and five eighths inches; oblique, four and one eighth inches. Height, five feet nine inches; circular width of chest, thirty-four and a quarter inches. Respirations, thirty-two in the minute. There was no constant cardiac pain, but he felt pain when the heart's action was much excited. Soreness, however, in the cardiac region was noted on several occasions; was probably constant; and corresponded to limits of dullness on percussion. At the upper limit of the dullness, it agreed precisely with the line which was drawn.

In this case there was no doubt of a previous cardiac disorder, yet the man did not suffer much from it, and appears to have done considerable duty until he was wounded and lost blood. In other cases there was comparatively slight trouble or even inconvenience, until the strength was much reduced by diarrhœa, or some other source of exhaustion. In other words, we have here a repetition of what was noticed when discussing valvular affections. The same explanation might be advanced to account even for the cases of enlargement originating seemingly in fevers. Yet I do not think, on analyzing my series carefully, that it holds good except for a limited number.

In thus examining into the causes of hypertrophy of the heart in soldiers, I have not mentioned the cases originating in connection with valvular or pericardial diseases, or in consequence of affections of the lungs or kidneys, because, though they were met with, they presented nothing different from what is constantly encountered, and from what every observer is familiar with. Yet it may be stated that, excepting enlargements associated with valvular diseases, illustrations of the causations mentioned were very rare.

What becomes of cases of hypertrophy such as I have described in detail? Do they recover; or do they get rapidly worse, and finally die, in consequence of secondary affections, which hypertrophy of the heart may induce? I did not see a death from it, either directly or indirectly; but, on the other hand, I never saw an instance in which the disease had reached a very marked point, in which a cure was accomplished. Yet I think I have seen enlarged hearts decrease. I found the complaint amenable to treatment to a very high degree, and excellent health was enjoyed by those who, after the force of the action was reduced by means of treatment, lived regularly and

Cases of hypertrophy without valvular lesions amenable to treatment.

did no laborious work. The following cases, which I had an opportunity of examining at long intervals, will confirm the opinion advanced.

CASE XXXVI. *Hypertrophy of the Heart, probably succeeding to Fever; Quieting of the Action of the Heart under Treatment; Persistence of the Hypertrophy when seen Twenty Months after Discharge, but Lessening of Signs of Enlargement.* — Charles W. P——, private, Company F, 2d Pennsylvania Artillery, aged nineteen, a farmer before entering the service, enlisted February 2d, 1864, for three years. Stated that he suffered occasionally from palpitation and pain for about five years prior to enlistment; otherwise was perfectly healthy. Had typhoid fever in March; by May 15th was sent to rejoin his regiment, with which he remained until July 18th, but was on duty only part of the time, and could not keep up on the marches. Was sent to Division Hospital in July, and came into my wards, in Philadelphia, September 3d. The palpitations only became marked subsequently to the fever, which was followed by diarrhoea after rejoining his regiment. Indeed, though he said that he had occasional palpitation prior to enlisting, it was very doubtful if by this he meant any thing more than that his heart beat more strongly on very active exertion; for he was able to run without being put out of breath, and kept up well with the others when drilling on the double quick on first enlisting, and even until he had the fever.

He was a temperate man, using neither ardent spirits nor tobacco; of fine physique; gums healthy; digestive functions in excellent order; much pain in cardiac region, almost constant, but subject to marked exacerbations. Impulse one hundred, extended and forcible; first sound heavy, long, muffled; second, distinct, but not sharp. Transverse diameter of percussion-dullness, four inches.

After a treatment of seven months — the man having been recommended for the Veteran Reserve, 1st Battalion, but not mustered in — the impulse was reduced to seventy-eight; still, however, forcible, and still felt in several intercostal spaces. The first sound, though yet rather heavy, was decidedly less lengthened than formerly, and there was far less palpitation.

The man was discharged May 29th, 1865, having kept up his treatment — for the main part by aconite — more or less actively. He went home, and did little or no work, and I found him, December 12th, 1866, as a conductor on one of our city railroad cars. He told me that he had held this situation for eight months, and that he had not any steady pain in the cardiac region, though occasionally a pain there annoys him for a day or two. He can even exercise freely without shortness of breath, though not so well as before enlisting. Examining his heart, I perceived that the impulse was still rather forcible;

but it was regular, and only seventy-six in the minute. Both sounds were well marked; the first was heavy. The transverse diameter of the heart was three and five eighths, the perpendicular three inches.

In this case, then, a marked amelioration in both symptoms and signs took place, and continued for about twenty months after the treatment had been stopped. Nay, it appeared as if the enlarged organ had been absolutely reduced in size. Without, however, mooted this point, it is very certain that the patient's heart did not increase, and that he became more and more comfortable. It may be even argued, as just mentioned, that the heart diminished in size. But the evidence is, I admit, not wholly free from doubt; for I am aware that an engorgement of the cavities of the heart, such as is often found in instances of hypertrophy in which the action is very forcible, may cause the percussion-dullness to be greater than when the action is much quieted. Though I do not think that so considerable a difference as was here found, can be thus explained.

In another case (Case-Book V., p. 50), in which, however, the hypertrophy was much more decided, and which was, in fact, a most marked example of dilated hypertrophy—the percussion-dullness, in May, 1865, measured, in a transverse direction, four and one eighth inches; in a perpendicular direction, three and seven eighths. The impulse was very extended and forcible, and when uncontrolled by medicine, one hundred and twenty. The man had no dropsy. He was but a short time under treatment; since soon after he was admitted, the military hospital was broken up. In January, 1866, I came across him, and found him, though looking very well, still suffering from shortness of breath and palpitation, at times very violent. He had been unable to do any thing save the lightest work. The impulse was very strong; the first sound dull and heavy, and the cardiac percussion-dullness augmented; transverse diameter four and three eighths, perpendicular, four inches.

Now, in this case, it is evident that the hypertrophy of the heart did not lessen, but increased, though the action of the heart became, perhaps, quieter; and the general health of the patient, which, when he was first seen, was not very good, had become much better. The increase in the enlargement was probably due to the absence of treatment; for the man, as already stated, was only for a brief period with us before he was discharged.

In another case (Luther R——, Case-Book I., p. 125), in which the history indicated that the cardiac enlargement followed an

attack of so-called typho-malarial fever contracted on the Chickahominy, the patient, when he came into my hands, in June, 1863, while presenting the appearance of good health, showed, with the usual symptoms and signs of hypertrophy, a cardiac percussion-dullness of four and a half inches, transversely ; three and seven-eighths perpendicularly ; and four and seven-eighths obliquely to apex. The impulse was eighty-eight, and quite forcible : respirations twenty-four. This patient having lost nearly all of his upper teeth subsequently to the fever, and being unfit for duty in the field, was, after he had been treated for a few months, detailed to do light duty as nurse, and acting as such, remained under observation for one year. The treatment, which consisted of various sedatives, but, towards the last, exclusively of aconite, was kept up with considerable regularity nearly this whole time ; and with the result that all sensitiveness in the cardiac region, at one time great, disappeared ; that he no longer had any palpitation except on active exertion ; and that, while the first sound remained heavy and prolonged, and the impulse strong, accurate percussion of the heart indicated that the transverse diameter had decreased by one inch, the oblique by three eighths of an inch, while the perpendicular remained the same. I have heard from the man since his discharge ; he is unable to do any thing but light work on a farm, and still has strong beating of the heart. I received this report about one year after his discharge. Clearly he had hypertrophy of the heart ; clearly it persists ; but clearly, also, it was much benefited by treatment.

As so great stress is laid on proper treatment, and as the results show that so much can be done for these cases of hypertrophy, it is right that the means employed should be more fully mentioned. Of course, in every case, abstinence from all agents, and avoidance of all causes, which excite the heart, was insisted upon, and as faithfully as can be done with soldiers, enforced. Where diarrhoea, or any digestive disturbances existed, or anæmia was present, these were, as far as possible, removed ; in other words, every thing was done to prevent the heart's movements from being, or remaining frequent. And in each instance, attempts were made to control the further increase of the organ by agents which reduce its action. With this view, I tried digitalis, veratrum viride, aconite, gelseminum, belladonna, both internally and externally, and, in addition, many other articles. Nothing answered as well, as universally well, as aconite. But I had to learn that, to be successful with it,

The treatment employed in these cases.

it must be given in a very different manner from what it has hitherto been, and still usually is. It must be persevered in for months. My general plan was to administer one or two drops of a good tincture twice or three times daily, and to go on without decreasing or increasing the dose until the impulse of the heart had become decidedly softer; at the same time, usually, the pulse was lessened in frequency. Then the medicine was kept up in varying doses, always watching whether or not it produced the desired effect, or acted too much. It did not interfere with digestion, nor impair in the least the general health. And what, fearing its activity as a sedative, I commenced hesitatingly and doubtingly, I soon was taught to use fearlessly and sanguinely. I am certain that in a large number of cases, thus employed, the remedy prevented the further growth of the heart. Nay, I think that in some — and I have given the details of a few — it lessened the already increased bulk of the organ. But the last point is one to a great extent of opinion, for the differences in the physical signs may, as above mentioned be, perhaps, explained in a different manner; and, as I cannot prove my supposition by absolute demonstration, I shall not here further discuss it. But, as regards beginning cases of hypertrophy, cases with already slight increase, cases standing as it were on, or just having passed the border line between functional disturbance and organic change, the influence of the drug is such as not, I think, to admit of doubt.

CASE XXXVII. *Signs of beginning Hypertrophy following Functional Disturbance of the Heart; their Disappearance under the use of Aconite; Hemoptysis, with Temporary Blowing Sound in Pulmonary Artery* (Case-Book III., p. 100). — Henry B —, private, Company B, 146th New York Volunteers, age 22 years, by occupation when enlisted a clerk. Enlisted August 13th, 1862, for three years, being at that time in perfect health. Did duty with his regiment up to June 1st, 1863, when he was first affected with palpitation. After that could not drill or undergo any active exertion or do hard work, and was detailed as clerk for his captain. While on the march with his regiment, moving with the army toward Maryland and Pennsylvania, in the month of June, 1863, he fell in the ranks with a severe attack of palpitation. Unable afterwards to keep up with his regiment, he was always obliged to come up as a straggler after it had encamped. Yet he did not leave it until April 30th, 1864, when, after being sent to various hospitals, he was directed to my ward in Philadelphia May 11th, 1864. He had at that time frequent palpitation and a sharp pain in the cardiac region; an impulse forcible and extended; a comparatively large area of percussion-dullness over the heart, though not one showing a very decided increase of the organ; and a dull first sound. Pulse eighty.

He took for a week tincture of hyoscyamus 3ij twice daily, without any perceptible effect, and was then placed on a drop of a strong tincture of aconite (two and a half times the strength of that officinal in the Pharmacopœia) twice daily.

May 20th. Impulse seventy-two; not so many palpitations. Aconite three times daily.

June 17th. Has had several small hemorrhages from the lungs within the last two weeks, for which, while continuing the aconite, he has been taking aromatic sulphuric acid. A distinct, systolic blowing is perceptible in the second interspace on the left side. The impulse of the heart appears less extensive, and is markedly decreased in force; seventy-two. Temporarily stops aconite, continues acid.

June 30th. Had one slight attack of hæmoptysis since last note. Blowing sound in pulmonary artery has almost disappeared, being no longer distinctly audible. Has had more palpitation. Impulse eighty. Resumes the strong tincture of aconite, two drops at night; continues acid twice daily.

July 6th. Impulse seventy-six; still has occasionally palpitations; acid stopped; aconite given twice daily some days.

July 25th. Impulse seventy-eight; seems absolutely feeble — so much has its force been reduced. Treatment suspended.

August 4th. Impulse eighty; but has not resumed its excessive force. Only seldom, and then at night, active beating of the heart. Does now light duty as clerk.

August 22d. Impulse seventy-two, not in the least forcible, nor is there any abnormal character of sounds. Man looks and feels well; and, some time after this examination, returned to his regiment.

The cases of hypertrophy that I have brought forward in this discussion of the subject, and all, indeed, which have been embraced here in any general remarks, were either simple, or with more or less dilatation; but all cases in which the increase in the size of the walls predominated over that of the cavities. As a rule, too, it may be mentioned that in most of them the left ventricle rather than the right seemed to be particularly implicated. Pure, or almost pure, instances of *dilatation* were very infrequent. I met with only a few, among upwards of a hundred examples of enlargement of the heart, uncomplicated with valvular disease. When encountered, they presented the usual symptoms of enfeebled action of the organ, with the well-known accompanying physical signs.

In the foregoing pages I have described the organic affections of the heart met with among soldiers; and it is not my purpose to examine the functional ones particularly.

Cases of enlargement with predominant dilatation infrequent.

Of irritable hearts.

Yet the mass of cardiac disorders is not organic, but functional. And of these again a very large proportion belong to the group which I have designated "irritable hearts." Elsewhere (*Medical Diagnosis*) I have endeavored to depict the outlines of this curious malady; and I intend to publish a fuller narrative. To complete, however, this essay, and furnish a means of comparison, I will indicate very briefly the characters of the ailment. They are: great frequency of the action of the heart, constantly recurring attacks of palpitation, and pain in the præcordial region. The very rapid action of the heart is associated with an extended, not forcible, but an abrupt or jerky impulse, sometimes of irregular rhythm, and with a short first sound, and a very distinct second sound. The disorder is an extremely obstinate one, and much exercise is impossible; the malady often exists when the general health is perfect. When present to a marked degree, it totally unfits the soldier for active duty — as much so as the worst organic disease.

On bringing this inquiry into cardiac affections to an end, it is scarcely worth while to dwell on the lessons it inculcates. The cases speak for themselves. It has become Conclusions. apparent how underlying the development and aggravation of cardiac maladies are certain general laws, the recognition of which is of the deepest practical importance to the physician; how the signs of merely disordered function are not to be slighted, since it may lead to organic disease; how the amount of suffering and the inability to exertion are often more in proportion to the extent of the disturbed function than of the structural change; how little the cardiac malady may show itself or become a source of inconvenience as long as the general health remains good; how quickly all deterioration of health reacts on the heart; and how, after exhausting diseases, especially fevers, we should be careful not to permit over-exercise or sustained exertion.

These points are alike important to the student of cardiac pathology in civil and in military life. But there are some further questions here mooted which concern the latter alone. Ought an affection of the heart to be a disqualifying element for enlisting? Ought it to become a cause for discharge? Obviously it cannot be recommended to receive into the ranks men with any defect of the circulation. But the mere fact of a disorder of the heart existing ought not to be a cause for discharge. Some cases are curable, and others can do much military duty, though it may not be the most active field service. If a nation engaged in war

has a population flocking to its standard; if the ranks can be readily recruited with able-bodied men; if it does not care for the military efficiency of those who have been long enough in the army to attain military efficiency, unless this be combined with perfect physique — then, of course, it had best at once restore to the field and workshops those whose frames are no longer free from disorder. But under other circumstances many cases even of organic disease of the heart may be retained for service in garrison and the like, and a skillful medical officer should be chosen to select them — the principle of selection involving the extent and nature of the complaint, and taking as a guide the coexisting evidences of disturbed function, rather than the mere name, or label, it bears.

